"Prof. Dana further believes that many of the lagoon islands in the Paumotu or Low Archipelago and elsewhere have recently been elevated to a height of a few feet [elsewhere stated, two or three feet] although formed during a period of subsidence; but I shall endeavour to show, in the sixth chapter of the present edition, that lagoon islands which have long remained at a stationary level often present the false appearance of having been slightly elevated." And, in the body of the work, where the subject is taken up (p. 168), Mr. Darwin remarks that my belief in these small local elevations is grounded chiefly on the shells of Tridacnas embedded, in their living positions, in the coral rock at heights where they could not now survive.

The catalogue of such elevations which I give (p. 345)—after a dozen pages devoted to a discussion of the evidence respecting each—is as follows:—

Paumotu Archipelago ...	... Honden	2 or 3
,, ,, ...	... Clermont Tonnerre ...	2 or 3
,, ,, ...	... Nairsa or Dean's ...	6
,, ,, ...	... Elizabeth	80
,, ,, ...	... Metia or Aurora ...	250
,, ,, ...	... Ducie's	1 or 2?
Tahitian Group	... Tahiti...	0?
,, ,, ...	... Bolabola	?
Hervey and Rurutu Groups..	Atiu	12?
,, ,, ,,	Mauke ...	somewhat elevated.
,, ,, ,,	Mitiaro ... ,,	,,
,, ,, ,,	Mangaia	300
,, ,, ,,	Rurutu	150
,, ,, ,,	Remaining Islands ...	0?
Tongan Group	... Eua	300?
,, ,, ...	... Tongatabu	50 to 60
,, ,, ...	... Namuka and the Hapaii	25
,, ,, ...	... Vavau	100
Savage Island	... ...	100
Samoan or Navigator Islands	... ...	0
North of Samoa	Swain's	2 or 3
,, ,, ...	Fakaafo, or Bowditch	3
,, ,, ...	Oatafu, or Duke of York's	2 or 3
Scattered Equatorial Islands	Washington	2 or 3?
,, ,, ,,	Christmas	?
,, ,, ,,	Jarvis's	8 or 10
,, ,, ,,	Malden's	25 or 30
,, ,, ,,	Starbuck's...	?
,, ,, ,,	Penrhyn's	35
,, ,, ,,	Flint's and Staver's...	?
,, ,, ,,	Baker's	5 or 6
,, ,, ,,	Howland's	?
,, ,, ,,	Phœnix and McKean's	0
,, ,, ,,	Enderbury's	2 or 3?
,, ,, ,,	Newmarket	6 or 8?
,, ,, ,,	Gardner's, Hull's, Sydney, Birnie's	0?
Feejee Islands	... Viti Levu and Vanua Levu, Ovalau ...	5 or 6?
	Eastern Islands ...	0?
North of Feejees	... Horne, Wallis, Ellice, Depeyster	0?
Sandwich Islands ...	... Kauai...	1 or 2
,, ,, ...	... Oahu...	25 or 30
,, ,, ...	... Molokai	300
,, ,, ...	... Maui	12
Gilbert Islands	... Taputeuea...	2 or 3
,, ,, ...	... Nonouti, Kuria, Maiana, and Tarawa	3 or more.
,, ,, ...	... Apamama	5
,, ,, ...	... Apaiang or Charlotte.	6 or 7
,, ,, ...	... Marakei	3 or more.
,, ,, ...	... Makin	?
Carolines	... McAskill's... ...	60
Ladrones	... Guam...	600
,, ...	... Rota	600
Feis	... ...	90
Pelews	.. ..	0?
New Hebrides, New Caledonia, Salomon Islands ...	... ...	none ascertained.

Of the cases of elevation here included, in *only two* are shells of Tridacnas mentioned; these are Honden Island and Clermont Tonnerre, in the Paumotus. It is not necessary to go over the evidence for the several cases, as it is stated at length in my work.

Mr. Darwin, while speaking on the subject of local elevations, on p. 176, and discussing the facts as regards the Samoan (Navigator) Islands, adds that "in another place he [Mr. Dana] says (p. 326) that some of the [Samoan] islands have probably subsided." From the remark the reader would infer that this Samoan subsidence was a local subsidence, like the elevations under consideration. But in fact my statement is in a chapter on the general coral-island subsidence, and, on the page there referred to (p. 326), I cite Mr. Darwin's conclusions as to the Gambier Island subsidence, and put with it my own from the width of the reefs of Upolu and other reef-bordered islands. At the same place I allude to the greater subsidence of Tutuila—the island next to the west, as proved by its bold shores and small reefs.

In conclusion, if I differ widely, for the reasons above stated, from Mr. Darwin, as to the limits of the areas of subsidence and elevation in the Pacific, and believe that the new edition of his work shows little appreciation of some of the most important causes that have limited the distribution of coral reefs, I have, as I say in my work, the fullest satisfaction in his theory for the origin of atoll and barrier forms of reefs, and in the array of facts of his own observation which illustrate the growth of coral formations.

JAMES D. DANA

THE BRITISH ASSOCIATION

REPORTS

Report of the Committee on the Teaching of Physics in Schools, by Prof. G. C. Foster.

In view of the very great diversities in almost all respects of the conditions under which the work of different schools has to be carried on, the committee considered that in any suggestions or recommendations that they might make it would be impossible for them, with any advantage, to attempt to enter into details. They have therefore, in the recommendations which they have agreed upon, endeavoured to keep in view certain principles which they regard as of fundamental importance, without attempting to prescribe any particular way of carrying them out in practice.

They have assumed as a point not requiring further discussion, that the object to be attained by introducing the teaching of physics into general school-work is the mental training and discipline which pupils acquire through studying the methods whereby the conclusions of physical science have been established. They are however of opinion that the first and one of the most serious obstacles in the way of the successful teaching of the subject is the absence from the pupil's mind of a firm and clear grasp of the concrete facts and phenomena forming the basis of the reasoning processes they are called upon to study.

They therefore think it of the utmost importance that the first teaching of all branches of physics should be, as far as possible, of an experimental kind. Whenever circumstances admit of it, the experiments should be made by the pupils themselves and not merely by the teacher, and though it may not be needful for every pupil to go through every experiment, the committee think it essential that every pupil should at least make some experiments himself. For the same reasons they consider that the study of text-books should be entirely subordinate to attendance at experimental demonstrations or lectures, in order that the pupil's first impressions may be got directly from the things themselves, and not from what is said about them. They do not suppose that it is possible in elementary teaching entirely to do without the use of text-books, but they think they ought to be used for reviewing the matter of previous experimental lessons rather than in preparing for such lessons that are to follow.

With regard to the order in which the different branches of physics can be discussed with greatest advantage, considering that all explanation of physical phenomena consists in the reference of them to mechanical causes, and that therefore all reasoning about such phenomena leads directly to the discussion of mechanical principles, the committee are of opinion that it is desirable that the school teaching of physics should begin with a course of elementary mechanics, including hydrostatics and pneumatics, treated from a purely experimental point of view. The committee do not overlook the fact that very little progress can be made in theoretical mechanics without considerable familiarity with the processes of mathematics, but they believe that by making constant appeal to experimental proofs the study of mechanics may be profitably begun by boys who have acquired a fair knowledge of arithmetic, including decimals and proportion,

and as much geometry as is equivalent to the first book of Euclid. They believe that it will be found sufficient to impart such further geometrical knowledge as may be required, such, for instance, as a knowledge of the properties of similar triangles—in the first instance, during the course of instruction in mechanics.

In reference to the order in which the other departments of physics should be studied, the committee do not think it possible to prescribe any one order that is necessarily preferable to others that might be adopted; but they consider it desirable that priority should be given to those branches in which the ideas encountered at the outset of the study are most easily apprehended, and illustrations of which are most frequently met with in common experience. On these grounds they suggest that the elementary parts of the science of heat may advantageously follow mechanics; that elementary optics (including the laws of reflexion and refraction, the formation of images, colour, chromatic dispersion, and the construction of the simple optical instruments) should come next, and afterwards the elements of electricity and magnetism.* When it is found possible to include in the work of a school a fuller or more advanced course of physics than that here indicated, the committee are of opinion that the discretion of the master, guided by the circumstances of the case, will best decide in what direction the extension shall take place; they suggest, however, that an early place in the course should be given to elementary astronomy, both because it furnishes the grandest and most perfect examples of the application of dynamical principles, and because it promotes an intelligent interest in phenomena which, in the most superficial aspects at least, cannot fail to arrest the attention and familiarise the mind with the wide range of application of physical laws.

The committee are strongly of opinion that no very beneficial results can be looked for from the general introduction of physics into school teaching, unless those who undertake to teach it have themselves made it the subject of serious and continued study and have also given special attention to the best methods of imparting instruction in it. They therefore suggest that with a view to affording facilities to persons desirous of becoming teachers of physics for familiarising themselves with the most efficient methods and gaining experience in them, the Council of the British Association should invite the leading teachers of physics in the universities, colleges, and schools of the United Kingdom, to allow such persons, under suitable regulation, to be present at the instructions given by them, and, when practicable, to act as temporary assistants. The committee do not hereby mean that aspirants to the teaching function should be encouraged to drop in at random to hear any lecture by any established teacher who happened to be within reach; the kind of attendance they have in view would be systematic and continued for not less than some moderate period of time, such perhaps as two or three months, agreed upon at starting.

They believe that the benefits which might result from the adoption of such a plan are very great; the advantages to those who might avail themselves of it are obvious, and while teachers of established success would have a chance of spreading widely their methods of instruction, and in fact of founding schools of discipline, the stimulus to exertion afforded by the consciousness that they were being watched by men who were preparing themselves to occupy positions similar to their own would be of the most efficient kind.

SECTIONAL PROCEEDINGS

SECTION A—Mathematics

On the application of Kirchhoff's Rules for Electric Circuits to the solution of a Geometrical Problem, by Prof. Clerk-Maxwell, F.R.S.

The geometrical problem is as follows:—Let it be required to arrange a system of points so that the straight lines joining them into rows and columns shall form a network such that the sum of the squares of all these joining lines shall be a minimum, the first and last points of the first and last row being any four points given in space. The network may be regarded as a kind of extensible surface, each thread of which has a tension in each segment proportioned to the length of the segment. The problem is thus expressed as a statical problem, but the direct solution would involve the consideration of a large number of unknown quantities.

* It should be stated that one member of the committee did not approve of the order of the subjects suggested in the text.

This number may be greatly reduced by means of the analogy between this problem and the electrical problem of determining the currents and potentials in the case of a network of wire having square meshes, one corner of which is kept at a unit potential, while that of the other three corners is zero. This problem having been solved by Kirchhoff's method, the position of any point P in the geometrical problem with reference to the given points A B C D, is by finding the values of the potentials p_a p_b p_c p_d of the corresponding point in the electric problem when the corners a b c d respectively are those of unit potential. The position of P is then found by supposing p_a p_b p_c p_d placed at A B C D respectively, and determining P as the centre of gravity of the four masses.

On the Apparent Connection between Sun-spot and Atmospheric Ozone, by T. Moffat, M.D., F.G.S., &c.

At the last meeting of the British Association, Mr. Smith, of Birmingham, gave me a record of the number of new groups of sun-spots which appeared in each year for a number of years, and he asked me to compare the mean daily quantity of ozone in each year with the number of groups. I have done so, and in the following table I have given the mean daily quantity of ozone for nineteen years (1851-1869) with the number of groups.

Years.	Total number of new groups of spots which have appeared in each year.	Mean daily quantity of ozone.	Maximum actual number of groups.	Mean of ozone.
1851	141	2·6	141	2·6
1852	125	1·9	125	1·9
1853	91	2·0	202	1·5
1854	67	3·4	205	2·2
1855	28	·8	211	2·1
1856	34	·7	204	1·9
1857	92	1·1	166	2·6
1858	202	1·5	124	3·5
1859	205	2·2	130	2·0
1860	211	2·1	101	1·7
1861	204	1·9	224	1·9
			Mean, 166	Mean, 2·2
			Minimum.	Mean of ozone.
1862	166	2·6	91	2·0
1863	124	3·5	67	3·4
1864	130	2·0	28	·8
1865	93	2·4	34	·7
1866	45	1·7	98	1·1
1867	25	1·5	93	2·4
1868	101	1·7	45	1·7
1869	224	1·9	25	1·5
			Mean, 60	Mean, 1·7

It would appear from these figures that the maximum of sun-spot gives a maximum of ozone, and that the minimum of sun-spot gives the minimum of ozone. The years 1854 and 1863 appear to be exceptional. In 1854, however, ozone observations at Hawarden were suspended for three months, which may account for the irregularity in that year. There is, I think, in these results, sufficient to induce others to observe.

On the employment of Charts on Gnomonic Projection for the general purposes of Navigation, by G. J. Morrison.

The object of this paper is to recommend the adoption for the general purposes of navigation of charts on gnomonic projection, instead of on Mercator's projection, for the following reasons:—

1. The great circle course or shortest distance between any two points on the earth's surface is shown by a straight line on the chart. By means of a ruler, therefore, it is easy to find out in one moment the position of the great circle track along the whole course from point to point, and thus to see at a glance if there be any obstacles in the way, whereas the plotting of a great circle track on a Mercator chart involves the expenditure of a great deal of time and trouble.

2. When it is impossible to adopt the great circle course on account of obstacles in the way, it is easy, in a few moments, to lay down the best practicable course, whereas it is very difficult to do so on a Mercator chart.

3. The measurement of distances on a Mercator chart is somewhat difficult, whereas on these maps distances can be measured with a transparent scale, or a pair of compasses, in a few moments.

4. The relative position of the various points on the earth's surface is more correctly shown on these maps than on those of Mercator.

The great circle course appears to be the shortest and natural route, whereas, on an ordinary chart, it appears to be much longer than the Mercator route, and seamen get a bettter idea from these charts of the proper route to follow than they do from a Mercator's chart.

1. It may be objected that only a small portion of the earth can be got on one sheet, and there is a difficulty in drawing a great circle course between points situated on separate sheets. This is true; but by taking some pains in arranging the maps, as has been done in this case, and by repeating portions of the earth on two or more sheets, matters have been so arranged that scarcely any voyage can be named in which the ports of arrival and departure cannot be found either on the same sheet or on opposite sheets, in either of which cases the course can be laid down instantly; and even in the rare case of two ports being found on adjacent sheets only, the course can be laid down infinitely more easily than on a Mercator chart.

2. It is impossible to find the bearing of one point from another as can be done on a Mercator chart by a compass and a parallel ruler. This really is no disadvantage; no one ought to sail along a curved course, and no one need care to know anything about such a course. If this objection be seriously urged, it only proves that Mercator's charts have put false ideas into people's heads, and that other charts are required to replace them.

SECTION C—Geology

On the discovery of Microzoa in the Chalk Flints of the North of Ireland, by Joseph Wright.

The author observed that until 1872 only one rhizopod had been found in the Cretaceous rocks of Ireland, viz., *Ortitolina concava*, recorded by Mr. R. Tate, as occurring in the greensand. In November 1872, Prof. Rupert Jones read a paper before the Geological Society of Ireland, in which he announced the discovery of nine species of Foraminifera in the chalk and chalk flints of the North of Ireland.

Mr. Wright has examined the soft powdery material which often lines cavities in the chalk flints of Ireland, and has found 69 species of Foraminifera, 11 of Ostracoda, and sponge-spicules in abundance. A full list will appear as an appendix to the next Report of the Belfast Naturalists' Field Club.

Some observations on the "paramoudras" were added. The author considers that these originated in most cases by the deposit of flint around a nucleus of sponge. A microscopic examination shows that some are charged with spicules, whilst others are nearly free from them.

Prof. H. A. Nicholson exhibited and described specimens of three new species of *Cystiphyllum* from the Corniferous limestone of Canada and Ohio. Of these, *C. Ohioense*, Nich., is distinguished by its small size, deep, pointed calice, and small number of septa; *C. squamosum*, Nich., is remarkably flattened, the calice being very shallow and oblique; *C. fructicosum*, Nich., is a compound form, composed of numerous cylindrical, straight or slightly flexuous corallites.

The next paper, by the same author, was devoted to the definition of several species from the Lower Silurian of Ohio. *Alecto inflata* of Hall was regarded as an undoubted *Hippothoa*.

Description of new species of Polyzoa from the Lower and Upper Silurian rocks of North America, by Prof. H. A. Nicholson.—In this communication the author described the following new species of Polyzoa:—1. *Ptilodictya falciformis*, Nich.; 2. *P. emacerata*, Nich.; 3. *P. flagellum*, Nich.; 4. *P. ? arctipora*, Nich.; 5. *P. fenestelliformis*, Nich.; 6. *Fenestella nervata*, Nich. 7. *Ceramopora Ohioensis*, Nich.

Prof. Nicholson also read a paper on species *Favistella*. The type of the genus *F. stellata*, Hall, he regarded as identical with Goldfuss' *Columnaria alveolata*. A new species *Favistella* (*Columnaria*) *calicina*, Nich., was described.

These papers were illustrated by numerous and beautiful examples of the species referred to.

Note on the so-called "Crag" bed of Bridlington, by J. Gwyn Jeffreys, F.R.S.

In consequence of a request made by the late Prof. Phillips, not long before his lamented death, the author examined all the known collections of fossil shells from the celebrated "Crag" beds at Bridlington, and had furnished the Professor with a *catalogue raisonnée* for the new and forthcoming edition of his work on the Geology of Yorkshire. Dr. Jeffreys was lately at Bridlington with Mr. Leckenby, and ascertained that the "Crag" bed underlay the boulder-clay, and rested conformably on a bed of oolite shale of a purplish colour, which in one place appeared to have been triturated and redeposited in the form of clay. In this purplish clay they found a specimen of *Turritella erosa*, Couthouy (an arctic and North American shell), besides many other species which were common to the boulder-clay and Bridlington bed. All the species of shells found in the Bridlington bed, 64 in number, were high northern and now living. The author suggested that this deposit of shells might have been caused either by a deviation of the great arctic current in ancient times or by glacial conditions. It had clearly no relation to the Norwich Crag, as was formerly imagined to be the case.

SECTION D—Biology

Department of Anatomy and Physiology

This department was not distinguished by any communication which excited such popular interest as that of Prof. Ferrier last year, but it was fully up to the average of the last few meetings in the solidity of the papers and of the discussions. The President, Prof. Redfern, opened the Section with the address printed in full in Nature, vol. x. p. 327, which was no less admirable in style and elocution than in matter. If this was a model of a professorial lecture, the address of Dr. Hooker, also delivered before the entire Section, was equally one of a popular exposition of new and difficult scientific observations. The excellent series of illustrations and the actual specimens of the plants described, which were sent by Dr. Moore from the houses of the beautiful Botanical Gardens in Dublin, completed the interest of this admirable address.

The only report made to the department was from the committee appointed to investigate the conditions of intestinal secretion. It contained details of about sixty experiments, which confirmed, in the case of cats, Moreau's observation of the effect of division of the mesenteric nerves, showed that the secretory nerve fibres did not pass through the splanchnics, and ascertained the local effect of various neutral salts on intestinal secretion, as well as the interference of chloral, morphia, and other drugs with the local action of magnesian sulphate. The committee* was reappointed for the present year to continue these researches on the secretion and the movements of the intestines.

The most important communication on the first day was from Prof. Cleland, *On the Development of the Brain and the Morphology of the Auditory Capsule*. Beside many characteristically ingenious suggestions, the author maintained that the fourth ventricle is roofed in by nervous matter at an early period in the embryo, of which the ligula and the choroid plexus are the permanent vestiges. He also attempted to draw a parallel between the flocculus with the portio mollis and the optic lobes, tracts, and nerves. Prof. Huxley criticised these views at some length, dwelling particularly on the comparatively late development of the optic tracts, and denying that the roof of the primitive nervous canal is ever completed in the region of the bulb. A certain Goodsirian transcendentalism which appeared in Prof. Cleland's remarks has become rare among the younger school of morphologists, and probably stimulated his critic to attack what must have seemed like the revival of a thrice-slain foe; but apart from interpretations and views, there were several important observations in the paper which, it is hoped, will be given in detail with the necessary drawings.

A paper by Mr. Thomson followed, *On the Decomposition of Eggs*, in which the purely chemical changes, the penetration of bacteria, and the growth of fungi were severally described;† and Dr. Macalister exhibited a human skull with the rare abnormality of a lacrymo-jugal suture.

After the crowded audience which listened to Dr. Hooker's

* Dr. Brunton and Dr. Pye Smith.

† This paper will be found reported in the *London Medical Record* for Sept. 9.

address on Friday had dispersed, it seemed as if the room would have been left to anatomists and physiologists; but the arrival of blacksmiths, who began to erect a large black canvas, attracted popular interest, and the visitors who flocked in were rewarded by hearing and seeing Mr. Waterhouse Hawkins discuss the true character of the so-called clavicles of Iguanodon. His account of the difficulty he experienced in building his model with these bones in the position at first assigned them by Prof. Owen, of his finally hanging them up in front of it to be fitted in after each spectator's taste, and of the shameful destruction of the results of his skill and labour at New York, was no less graphic than the illustrations with which he proceeded to cover the canvas, showing the great reptile in every posture which would consist with the disputed bones being clavicles, ossa pubis, or marsupial bones. Mr. Hawkins advocated the last as the true character; but though in the discussion which followed, some anatomists were disposed to admit this approximation of the highest of reptiles to the marsupial (or rather to the monotreme) mammals, others refused to admit any reason for rejecting the identification of the bones in dispute with the long bird-like ossa pubis of allied reptilian forms, which was made several years ago by Prof. Huxley. So at least the professor himself must have thought, for he only appeared at the conclusion of the discussion in time to hear Mr. Balfour's remarkable paper *On the Development of Sharks*. This will doubtless appear elsewhere in full. It was crowded with facts, well observed, well stated, and well illustrated; and will prove of first-rate importance, not only for ichthyology but for the general doctrines of vertebrate development. Of many new facts ascertained, perhaps the most startling is the development of the notochord by direct cellular proliferation from the hypoblast. Whether it will ultimately be found that this is its normal mode of formation among Vertebrata, or that it may be developed from different layers in different animals, the effect of this observation will be almost equally important. Those anatomists who examined the beautiful series of sections on which Mr. Balfour founded his conclusions were satisfied of the accuracy of his histological facts. Prof. Huxley congratulated the author of the paper in terms of high commendation, though he inclined to believe that the apparent development from the lower embryonic layer might really be a secondary process. Mr. Lankester and Dr. Foster spoke of the service rendered to biology by Dr. Dohrn's Institute at Naples, where Mr. Balfour's observations were made, an institute to the success of which the British Association had the honour to contribute.

The following paper by Prof. Redfern, *On Food in Plants and Animals*, has been well reported in the *British Medical Journal* for August 29, p. 285. It was illustrated by a striking series of specimens of plants growing on different soils, and the laws of nutrition in organised beings generally were applied with great force to the practical question of the food of the labouring classes in the north of Ireland. Well delivered, and clearly expressed, it appeared to be understood as well as applauded by a full audience.

The first paper read in the department on Monday was by Prof. Macalister, *On the Tongue of the Great Anteater*, including an account of its enormous retractile muscles and of the salivary glands. In a discussion which followed, reference was made to the original dissection of *Myrmecophaga* by Prof. Owen, and also to the observations of Mr. Flower on the same parts, of which a summary was published in the *Medical Times and Gazette* of last year.

The next paper, by Dean Byrne, was an attempt to connect the functional development of thought with the structural development of the brain, in their gradual evolution throughout the Vertebrata, as well as in their growth from the infant to the adult. Many interesting facts of animal psychology were related, and many acute comments offered, but unfortunately the works from which the author drew his facts of anatomy, pathology, and development were either antiquated or otherwise imperfect representations of the present state of knowledge on the points in question.

Though the paper which followed was also by an outsider, the Professor of Chemistry in Edinburgh has had the advantage of a medical training, and his anatomy and histology were as accurate as his physics. Nothing could be more interesting than the way in which Dr. Crum Brown described the methods he employed to ascertain the exact position of the semi-circular canals of the ear, and the experiments he made on the sense of rotation. The substance of the communication will be found in the last number of the *Journal of Anatomy and Physiology*. Notwithstanding some criticisms offered by Mr. Charles Brooke on the acoustics of the paper, both its anatomical facts and its conclusion as to the function of the canals appeared to find general acquiescence; and this research may be regarded as another proof of how rich a field lies on the border-ground between the artificial territories into which we have divided the world of science.

Before the department rose, Dr. Caton exhibited a new adaptation of a microscope on the Hartnack model, for the purpose of examining the tissues in living mammals. It was a cheaper, and, as the author believed, a more readily applicable modification of the apparatus exhibited by Professors Stricker and Sanderson, at the Edinburgh meeting of the Association.

Prof. Huxley opened the last day of session with an account of his recent observations on the development of the *Columella auris* in Amphibia. While fully confirming the position of the quadratum (or malleus) in the mandibular arch of vertebrates, and of the incus in the hyoidean, these investigations appear to show conclusively that in the amphibian, at least, the columella (or stapes) begins as an outgrowth from the periotic capsule, and is therefore unconnected with any visceral arch; although, as the speaker was careful to state, it might yet be possible that the hyoid arch had, at a very early period, left some of the tissue of its topmost extremity adherent to the ear-capsule, and that this might afterwards give rise to the stapes. In the absence of Mr. Parker there was no one competent to criticise the paper from personal knowledge; but a word dropped as to the many changes in the accepted homologies of the ossicula auditus, elicited a masterly and characteristic exposition of the series of new facts, and the modifications of theory they have led to, from Reichert's first observations down to the present time. The embryonic structures grew and shaped themselves on the board, and shifted their relations in accordance with the views of successive observers, until a graphic epitome of the progress of knowledge on the subject was completed.

Mr. Lankester's paper which followed was also embryological. He described his observations on the development of the eye of Cephalopoda, made like those of Mr. Balfour in the Dohrn Institute at Naples. After correcting several of the statements made in text-books on the authority of Prof. Kölliker, the author pointed out the relation of the eye in the Dibranchiata to the less specialised organ of Nautilus, and showed how the ontogenesis of this structure in the highest mollusk corresponds with its gradually increasing complexity from its first appearance in the group, thus meeting one of Mr. Mivart's objections.

The session was appropriately concluded by a paper from the President, describing experiments made several years ago on the effects of ozone. The animals used were rabbits, and Prof. Redfern found them much less injuriously affected by breathing highly oxygenated air than has been supposed, while ozone in moderate amount (·4 per cent. and upwards) proved rapidly fatal, producing spasms, and death by apnœa. The lungs were found extensively emphysematous and congested, with engorgement of the right side of the heart.

Thus ended a busy and not uneventful meeting of the department. Comparing it with recent years, the room was never so crowded as it sometimes was at Bradford, nor so empty as it usually was at Brighton and Edinburgh. The most important paper last year, that of Prof. Burdon-Sanderson on the electrical changes which accompany the contraction of Dionæa, excited little popular interest, and the discussions at Edinburgh on various points of Cetacean anatomy, though carried on by Turner, Flower, Macalister, Struthers, and Murie, were caviare to the general. This year a corresponding importance may be fairly assigned to the embryological papers contributed by Prof. Huxley, Mr. Ray Lankester, Mr. Balfour, and Prof. Cleland. With a fair proportion of more popular expositions, the solid contributions which have been made during the last five or six years should attract a more constant attendance of anatomists and physiologists to this department. There were several distinguished Irish members of the Association whose presence was greatly missed at Belfast; and considering its nearness to Scotland, there was a remarkable lack of representatives from the northern universities. Apart from the intrinsic value of the papers read, there is so much to be gained from personal contact and discussion with men working at the same objects, that few probably feel at the conclusion of a meeting that they have not been rewarded for the sacrifice of time and convenience, and the scientific value of the Association entirely depends on its power of attracting those who are seriously engaged in the prosecution or communication of the subjects which form its several branches.